Specification Requirements	Check If Meets or Exceeds Spec	Fully Describe Offered Alternatives To Requirements
0903 Drill Unit; Trailer Mounted		
The Drill shall be a Skid Mounted CME-45C or Equal.		
1. General:		
a. Shall be a self-contained unit having a single engine power source.		
b. The power shall be appropriately directed to the hydraulic system and mechanically driven drill head.		
c. A hydraulically actuated folding upright drill frame with twin hydraulic feed cylinders shall be supplied.		
d. The unit shall be mounted on a steel skid with widely spaced sled type runners. The skid ground clearance shall be at least 12 inches. The length of the skid shall not exceed 10 feet. Ground contact pressure shall not exceed 4.2 pounds per square inch.		
2. Rotary Drive:		
a. The drill transmission shall have at least four speeds forward and one speed reverse. The transmission shall be mounted stationary on the drill main base frame with a heavy-duty clutch immediately adjacent to the transmission power input.		
b. The maximum drill spindle torque shall exceed 3,335 foot-pounds in first gear. Rotational speeds of the drill spindle shall range from at least 110 RPM in first gear to 700 RPM in fourth gear at 2,500 engine RPM.		
c. The output of the transmission shall power a single speed right angle drive. The right angle drive output shall turn a drive shaft connected to the rotary box.		
d. The rotary box shall be stationary with respect to the drive head travel. The rotary box shall be grease packed. The minimum rotary box chain size shall be 1.25-inch double 80 series. The rotary box shall turn a rotary drive bar that has a square cross section of at least 1.75 inches a side and shall be made of heat treated alloy steel.		

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e. The drill shall be equipped with a heavy-duty auger drive universal joint and 1-5/8 inch hexagon drive socket. Provision against shock overload to the rotary drive shall be accomplished through an easily adjustable torque-limiting clutch.		
3. <u>Vertical Drive:</u>		
a. The vertical drive shall consist of two double-acting hydraulic feed cylinders with an overall stroke or travel of at least 68 inches.		
b. The feed cylinders shall have a point of thrust centered upon the axis of the drill spindle. The feed slide bushings shall be split for ease of removal and replacement.		
c. The vertical drive shall have a maximum downward thrust of not less than 13,650 pounds and an upward or retract force of not less than 19,600 pounds.		
d. The feed cylinders shall have a minimum piston rod diameter of 1.375 inches to withstand compressive forces when retracting augers from the ground without rotation.		
e. Hydraulic gauges shall be provided on the control panel at the left rear of the drill to indicate in pounds per square inch the hydraulic feed pressure and system pressure.		
f. Hydraulic controls shall be furnished for varying the feed rate and down pressure. The maximum rate of feed shall not be less than 79 feet per minute and 55 feet per minute up.		

<u>4. Drill Power Unit:</u>

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a. The power unit shall be a self-contained electric starting 59 HP Deutz, F3L-913, 173 cubic inch, 3-cylinder diesel industrial engine with a hydraulic oil cooler.		
b. The unit shall be equipped with a heavy-duty oil bath air cleaner, a governor and a replaceable full flow oil filter.		
c. The unit shall have a 12-volt electric starting system consisting of a starter, alternator, battery and regulator. The battery will be stored in a lockable box.		
d. The unit shall have a keyed ignition switch on the control panel and an electrically controlled engine throttle.		
e. The power unit shall be equipped with a dry disc not less than 12 inches in diameter and a transmission having not less than four speeds forward and one reverse.		
f. The fuel tank shall have a capacity of not less than 14 gallons and shall have a lockable-vented filler cap and level indicator sights.		
5. <u>Upright Drill Frame and Angle Hole Assembly:</u>		
a. The upright drill frame shall be hydraulically actuated permitting 90-degree fold over. This shall be accomplished by two double acting hydraulic cylinders.		
b. The drive train to the rotary shall not have to be disconnected when folding the upright drill frame over to a horizontal travel position.		
c. The depth of the upright part of the base frame shall be at least 8 inches for rigidity.		
d. The angle hole feature shall be a direct coupled mechanical drive system. The drill rig shall be capable of drilling holes from vertical down to horizontal.		
e. Quick disconnect telescoping braces shall be provided for support of the upright drill frame in angle-hole positions 30 degree from horizontal.		
6. <u>Auger and Rod Guides for Angle Drilling</u>:		
a. Telescoping auger and rod guides shall extend		

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from the bottom of the upright drill frame to stabilize augers and drill rods during angle drilling.		
b. Pins shall secure the telescoping guide supports in a stored position upright drill frame members or at the desired amount of extension.		
7. <u>Hydraulic System:</u>		
a. The system shall have a heavy-duty engine driven tandem hydraulic pump run independently of the gear train with a capacity of not less than 30 GPM at 2,000 PSI.		
b. The system shall be equipped with a full flow replaceable element hydraulic oil filter in the high-pressure line from the pump and in the low pressure return lines.		
c. A hydraulic oil cooler shall be furnished.		
d. The hydraulic oil reservoir shall have adequate capacity and shall be equipped with a level indicator sight eyes, a lockable-vented filler cap and a magnetic drain plug.		
e. The hydraulic pump shall be driven from a point in the line of power transmission so that hydraulic power will be available whenever the engine is running.		
8. <u>Driller's Control Panel</u>:		
a. All controls and gauges needed for the various		

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drilling operations shall be placed in such a manner as to be easily accessible and convenient for the drill operator while permitting a view of the drilling operation at all times. The driller's control panel shall be mounted on the left rear of the drill and shall include the following instrumentation and controls:		
1. Keyed ignition switch and starter button.		
2. Push button emergency engine shut off switch.		
3. Electric engine throttle switch.		
4. Transmission gear selector and lockout clutch handle.		
5. Gauges: Hour meter, engine oil pressure, and voltmeter in a locking box.		
6. Hydraulic gauges for systems pressure and pull-down pressure.		
7. Feed rate, and feed pull-down pressure control.		
8. Feed and detented feed levers.		
9. Hydraulic controls for all standard and provided optional components.		
10. Provide an open detented valve spool, pressure gauge, hydraulic flow divider, and QD couplings.		
11. Three open valve spools with QD couplings.		
9. **<u>Safety and Emergency Shut-Down System</u>**		
a. Push button emergency shut off switches shall		

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be located on the control panel and on the right side of the main drill frame.		
b. Two emergency multi directional wobble shut off switches with extended levers shall be located near the bottom of and parallel to the feed cylinders.		
c. One emergency multi directional wobble shut off switch shall be located above and parallel to the axis of the cathead.		
d. When any emergency shut off switch is activated, a driveline brake is engaged to stop the spindle rotation in less than one revolution, the clutch is released, the cathead rotation instantly stops, and the engine is shut down.		
e. The system shall also include a lock out type clutch handle that positively locks the clutch handle in the down or disengaged position.		
f. A neutral start switch is to be included that only allows the engine to start when the clutch is engaged.		
g. A mast raising alarm shall be included to alert the drill crew to look for overhead obstructions.		
10. <u>Mast:</u>		
a. The mast shall be secured by bolts to the upright frame and shall be removable from the drill when not needed.		
b. With the mast in a vertical position, the sheaves shall be not less than 15 feet from the base of the drill main frame.		
c. The maximum line pull of the draw works shall be evenly distributed on four cross-braced tubular members with an adequate margin of safety.		
d. Pairs of 8-inch diameter sheaves shall be aligned with the rope or wire rope they carry.		
e. Two hydraulic cylinders shall be provided to raise and lower the upright drill frame and mast.		
11. <u>Draw Works</u>		
a. The draw works shall include a cathead, and two hydraulic hoists, and a hydraulic wireline hoist.		

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b. The cathead shall be hydraulically powered and have a pulling capacity of not less than 1,370 pounds. The cathead shall be located at the right rear corner of the drill at right angles to the long axis of the drill frame. The diameter of the drum shall be 8 inches and the length 7.5 inches. Maximum peripheral speed shall be not less than 710 feet per minute.		
c. The first hydraulic hoist shall have a maximum pulling capacity of not less than 3,200 pounds. Maximum line speed shall be not less than 100 feet per minute. One hydraulic lever shall be furnished for controller hoisting or lowering and rotation speed. The hoist shall include at least 60 feet of 3/8-inch diameter wire rope and a safety Shur-Lok hook.		
d. The second hydraulic hoist shall have a maximum pulling capacity of not less than 1,800 pounds. Maximum line speed shall be not less than 200 feet per minute. One hydraulic lever shall be furnished for controlling hoisting or lowering and rotation speed. The hoist shall include at least 60 feet of 3/8-inch diameter wire rope and a Shur-Lok hook.		
e. The hydraulic wire line hoist shall have a maximum pulling capacity of not less than 1,800 pounds. Maximum line speed shall be not less than 200 feet per minute. One hydraulic lever shall be furnished for controlling hoisting or lowering and rotation speed. The hoist shall be capable of holding up to 900 feet of 3/16 inch diameter wireline cable.		
12. <u>Draw Winch</u>		
a. A hydraulic winch with a maximum pulling capacity of 12,000 pounds shall be furnished for pulling the skid-mounted drill. A single hydraulic lever shall control rotation direction		

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and speed. The assembly shall include a two-speed hydraulic motor and have a maximum line speed of 40 feet per minute. The winch assembly shall include 100 feet of ½ inch wire rope with hook and roller guides.		
13. <u>Sliding Base, In-Out</u>		
a. A sliding base shall be furnished for moving the drill in and out so that the drill spindle can be positioned to facilitate alignment of augers and drill rods and to provide clearance from the hole for handling augers, casing and other down-hole tools. With the slide base extended, the center of the auger drive shall be at least 15inches from the rear of the skid to provide ample working room. The in-out slide base shall have at least 15 inches of travel and shall be hydraulically operated. The in-out slide base shall have a replaceable nylatron (or equal) wear plate between the metal slide surfaces.		
14. <u>Sliding Base, Sideways:</u>		
a. A sliding base shall be furnished for moving the drill to either side so that the drill spindle can be positioned to facilitate alignment of augers and drill rods when starting or drilling a hole. The sideways slide base shall have at least 8 inches of travel and shall be hydraulically operated. The sideways slide base shall have nylatron (or equal) wear plate between the metal slide surfaces.		
15. <u>Mud Pump Assembly</u>:		
a. The mud or water pump shall be a John Bean L0918 (420) or equal and shall have an infinitely adjustable pump output of 0 to 25 gallons per minute and a maximum pressure of 500 PSI. Power for the mud pump shall be supplied by a		

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hydraulic motor operated from the drill hydraulic system.		
b. The assembly shall include a pressure gauge, pressure relief valve, a 1-1/2 inch pressure port with sufficient 1-1/2 inch high-pressure hose to connect to the control panel, service tee with 1-inch bypass at the operator's panel.		
c. A 2-inch by 25-foot long suction hose with foot valve with QD fittings shall be provided. Provisions shall be made for drainage of the mud pump and lines.		
d. The assembly shall include a standpipe with hose to control panel.		
e. The assembly shall include a water swivel, side feed, stabilized, with QD plumbing.		
16. <u>Standpipe with Hose to Control Panel</u>		
a. A 1-1/2 inch diameter standpipe shall be mounted on the upright drill frame and connected by a 1-1/2 inch high-pressure hose to the mud pump output at the control panel. A 1-1/2 inch high-pressure hose with QD fittings shall connect the standpipe to the stabilized side feed water swivel.		
17. <u>Hydraulic Hammer:</u>		
a. A hydraulic hammer system shall be furnished that will lift a 140 pound drive weight 30 inches and completely release the weight for a 30 inch free fall. The system shall have a minimum rate of at least 50 blows per minute.		

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b. The fall height shall be controllable within a tolerance of plus or minus ½ inch. A method for visual verification of the fall height of the weight while the hammer is in operation shall be provided.		
c. The hammer shall be mounted on one single acting hydraulic cylinder, which is dedicated to the operation of the hammer device and shall be attached to the upright drill frame opposite of the control panel. The hammer device shall be hydraulically raised or lowered by this hydraulic cylinder through a minimum of 60 inches of vertical travel. A 140-pound drive weight shall be furnished. A safety feature shall be furnished that will prevent the hammer from operating if the anvil is not in place.		
18. Drill Dimension:		
a. The width of the drill main frame shall not exceed 20 inches. The width of the slide base shall not exceed 24.5 inches. The height of the drill including the upright drill frame folded shall not exceed 50 inches from the bottom of the slide base. The height of the drill frame from the bottom of the slide base to the highest point on the mast in the travel position shall not exceed 54 inches.		
19. Color:		
The drill unit, and all parts normally painted shall be primed and painted Dupont Hi-Vis Lime Green complying with specifications		
20. Compliance Inspection:		
To curtail manufacturing errors prior to delivery, the successful bidder shall arrange and fully fund a three (3) day factory compliance inspection for two WSDOT representatives to review the completed unit. Funded expenses are to include coach class round trip air fair, ground		

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transportation originating and terminating at the airport, 2 nights lodging, and meals.		
21. Publications:		
a. Each unit shall be delivered with an operator's manual.		
b. Bidders shall provide the Service, and Parts Manuals for the drill and associated items as annotated below.		
1 Parts Manual		
1 Service Manual		